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=> s elongase
L1 1349 ELONGASE

=> s elongate? (3w) fatty (w) acid
L2 229 ELONGATE? (3W) FATTY (W) ACID

=>

=> s Oomycete
L3 5863 OOMYCETE

=> s l1 and l2 and l3
L4 0 L1 AND L2 AND L3

=> s l1 and l2
L5 17 L1 AND L2

=> d ibib abs l5 1-17

L5 ANSWER 1 OF 17 MEDLINE on STN
ACCESSION NUMBER: 2005551393 IN-PROCESS
DOCUMENT NUMBER: PubMed ID: 15129327
TITLE: Zebrafish cDNA encoding multifunctional Fatty Acid **elongase** involved in production of eicosapentaenoic (20:5n-3) and docosahexaenoic (22:6n-3) acids.
AUTHOR: Agaba Morris; Tocher Douglas R; Dickson Cathryn A; Dick James R; Teale Alan J
CORPORATE SOURCE: Institute of Aquaculture, University of Stirling, Stirling FK9 4LA, Scotland, UK.
SOURCE: Marine biotechnology (New York, N.Y.), (2004 May-Jun) 6 (3) 251-61. Electronic Publication: 2004-05-06.
Journal code: 100892712. ISSN: 1436-2228.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: NONMEDLINE; IN-PROCESS; NONINDEXED; Priority Journals
ENTRY DATE: Entered STN: 20051018
Last Updated on STN: 20051020
AB Enzymes that increase the chain length of fatty acids are essential for

biosynthesis of highly unsaturated fatty acids. The gLELO gene encodes a protein involved in the elongation of polyunsaturated fatty acids in the fungus Mortierella alpina. A search of the GenBank database identified several expressed sequence tag sequences, including one obtained from zebrafish (Danio rerio), with high similarity to gLELO. The full-length transcript ZfELO, encoding a polypeptide of 291 amino acid residues, was isolated from zebrafish liver cDNA. The predicted amino acid sequence of the open reading frame shared high similarity with the **elongases** of Caenorhabditis elegans and human. When expressed in Saccharomyces cerevisiae, the zebrafish open reading frame conferred the ability to lengthen the chain of a range of C18, C20, and C22 polyunsaturated fatty acids, indicating not only that biosynthesis of 22:6n-3 from 18:3n-3 via a 24-carbon intermediate is feasible, but also that one **elongase** enzyme can perform all three elongation steps required. The zebrafish enzyme was also able to **elongate** monounsaturated and saturated **fatty acids**, and thus demonstrates a greater level of promiscuity in terms of substrate use than any **elongase** enzyme described previously.

L5 ANSWER 2 OF 17 MEDLINE on STN
ACCESSION NUMBER: 2005027689 MEDLINE
DOCUMENT NUMBER: PubMed ID: 15652569
TITLE: Biochemical characterization of **elongase** activity in corn (Zea mays L.) roots.
AUTHOR: Schreiber Lukas; Franke Rochus; Lessire Rene
CORPORATE SOURCE: Department of Ecophysiology, Institute of Cellular and Molecular Botany (IZMB), University of Bonn, Kirschallee 1, D-53115 Bonn, Germany.. lukas.schreiber@uni-bonn.de
SOURCE: Phytochemistry, (2005 Jan) 66 (2) 131-8.
Journal code: 0151434. ISSN: 0031-9422.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200504
ENTRY DATE: Entered STN: 20050119
Last Updated on STN: 20050412
Entered Medline: 20050411

AB Chemical analysis of 4-day-old corn (Zea mays L.) root cell walls revealed that the lipophilic biopolymer suberin forms an important constituent of rhizodermal and hypodermal cell walls. Identified aliphatic monomers had chain lengths ranging from C16 to C26 and they belonged to 5 substance classes (omega-hydroxycarboxylic acids, 1,omega-dicarboxylic acids, 2-hydroxycarboxylic acids, carboxylic acids and alcohols) by which suberin is characterized. Biochemical experiments proved the occurrence of **elongase** activities in corn roots. Highest enzymatic activities were found in corn root microsomes, and major products synthesized by root **elongases** were **elongated fatty acids** with chain lengths ranging from C20 to C24. Preferred substrates of root **elongases** were acyl-CoAs of the chain length C18 and C20, whereas monounsaturated acyl-CoAs (C16:1 and C18:1) and acyl-CoAs of lower (C12-C16) and higher chain lengths (C22-C24) were rarely elongated. **Elongase** activities significantly decreased over the length (40 cm) of 10-day-old corn roots going from the young tip to the older base of the root. Thus, results presented here show the presence and activity of **elongases** in roots of plants.

L5 ANSWER 3 OF 17 MEDLINE on STN
ACCESSION NUMBER: 2004499304 MEDLINE
DOCUMENT NUMBER: PubMed ID: 15377762
TITLE: Biosynthesis of very-long-chain polyunsaturated fatty acids in transgenic oilseeds: constraints on their accumulation.
AUTHOR: Abbadi Amine; Domergue Frederic; Bauer Jorg; Napier Johnathan A; Welti Ruth; Zahringer Ulrich; Cirpus Petra;

Heinz Ernst

CORPORATE SOURCE: Institut fur Allgemeine Botanik, Universitat Hamburg, 22609 Hamburg, Germany. abbadi@botanik.uni-hamburg.de. <abbadi@botanik.uni-hamburg.de>

SOURCE: Plant cell, (2004 Oct) 16 (10) 2734-48. Electronic Publication: 2004-09-17.
Journal code: 9208688. ISSN: 1040-4651.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
OTHER SOURCE: GENBANK-AF054824; GENBANK-AF428243; GENBANK-AJ222980; GENBANK-AX035537; GENBANK-AY082392; GENBANK-AY082393; GENBANK-U79010
ENTRY MONTH: 200503
ENTRY DATE: Entered STN: 20041007
Last Updated on STN: 20050323
Entered Medline: 20050322

AB Omega6- and omega3-polyunsaturated C20 fatty acids represent important components of the human diet. A more regular consumption and an accordingly sustainable source of these compounds are highly desirable. In contrast with the very high levels to which industrial fatty acids have to be enriched in plant oils for competitive use as chemical feedstocks, much lower percentages of very-long-chain polyunsaturated fatty acids (VLCPUFA) in edible plant oils would satisfy nutritional requirements. Seed-specific expression in transgenic tobacco (Nicotiana tabacum) and linseed (Linum usitatissimum) of cDNAs encoding fatty acyl-desaturases and **elongases**, absent from all agronomically important plants, resulted in the very high accumulation of Delta6-desaturated C18 fatty acids and up to 5% of C20 polyunsaturated fatty acids, including arachidonic and eicosapentaenoic acid. Detailed lipid analyses of developing seeds from transgenic plants were interpretated as indicating that, after desaturation on phosphatidylcholine, Delta6-desaturated products are immediately channeled to the triacylglycerols and effectively bypass the acyl-CoA pool. Thus, the lack of available Delta6-desaturated acyl-CoA substrates in the acyl-CoA pool limits the synthesis of **elongated** C20 **fatty acids** and disrupts the alternating sequence of lipid-linked desaturations and acyl-CoA dependent elongations. As well as the successful production of VLCPUFA in transgenic oilseeds and the identification of constraints on their accumulation, our results indicate alternative strategies to circumvent this bottleneck.

L5 ANSWER 4 OF 17 MEDLINE on STN

ACCESSION NUMBER: 2001695342 MEDLINE
DOCUMENT NUMBER: PubMed ID: 11743108

TITLE: A condensing enzyme from the seeds of Lesquerella fendleri that specifically **elongates** hydroxy **fatty acids**.

AUTHOR: Moon H; Smith M A; Kunst L
CORPORATE SOURCE: Department of Botany, University of British Columbia, Vancouver, British Columbia V6T 1Z4, Canada.

SOURCE: Plant physiology, (2001 Dec) 127 (4) 1635-43.
Journal code: 0401224. ISSN: 0032-0889.
PUB. COUNTRY: United States
DOCUMENT TYPE: Journal; Article; (JOURNAL ARTICLE)
LANGUAGE: English
FILE SEGMENT: Priority Journals
ENTRY MONTH: 200204
ENTRY DATE: Entered STN: 20011217
Last Updated on STN: 20020417
Entered Medline: 20020416

AB Lesquerella fendleri seed oil contains up to 60% hydroxy fatty acids, nearly all of which is the 20-carbon hydroxy fatty acid lesquerolic acid

(D-14-hydroxyeicos-cis-11-enoic acid). Previous work suggested that lesquerolic acid in L. fendleri was formed by the elongation of the 18-carbon hydroxy fatty acid, ricinoleic acid. To identify a gene encoding the enzyme involved in hydroxy fatty acid elongation, an L. fendleri genomic DNA library was screened using the coding region of the Arabidopsis Fatty Acid Elongation1 gene as a probe. A gene, LfKCS3, with a high sequence similarity to known very long-chain fatty acid condensing enzymes, was isolated. LfKCS3 has a 2,062-bp open reading frame interrupted by two introns, which encodes a polypeptide of 496 amino acids. LfKCS3 transcripts accumulated only in the embryos of L. fendleri and first appeared in the early stages of development. Fusion of the LfKCS3 promoter to the uidA reporter gene and expression in transgenic Arabidopsis resulted in a high level of beta-glucuronidase activity exclusively in developing embryos. Seeds of Arabidopsis plants transformed with LfKCS3 showed no change in their very long-chain fatty acid content. However, when these Arabidopsis plants were crossed with the transgenic plants expressing the castor oleate 12-hydroxylase, significant amounts of 20-carbon hydroxy fatty acids accumulated in the seed, indicating that the LfKCS3 condensing enzyme specifically catalyzes elongation of 18-carbon hydroxy fatty acids.

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ACCESSION NUMBER: 2005:15681 AGRICOLA
DOCUMENT NUMBER: IND43672333
TITLE: Biochemical characterization of **elongase** activity in corn (Zea mays L.) roots.
AUTHOR(S): Schreiber, L.; Franke, R.; Lessire, R.
AVAILABILITY: DNAL (450 P5622)
SOURCE: Phytochemistry, 2005 Jan. Vol. 66, no. 2 p. 131-138 ISSN: 0031-9422
NOTE: Includes references
DOCUMENT TYPE: Article
FILE SEGMENT: Non-US
LANGUAGE: English

AB Chemical analysis of 4-day-old corn (Zea mays L.) root cell walls revealed that the lipophilic biopolymer suberin forms an important constituent of rhizodermal and hypodermal cell walls. Identified aliphatic monomers had chain lengths ranging from C16 to C26 and they belonged to 5 substance classes (omega-hydroxycarboxylic acids, 1,omega-dicarboxylic acids, 2-hydroxycarboxylic acids, carboxylic acids and alcohols) by which suberin is characterized. Biochemical experiments proved the occurrence of **elongase** activities in corn roots. Highest enzymatic activities were found in corn root microsomes, and major products synthesized by root **elongases** were **elongated fatty acids** with chain lengths ranging from C20 to C24. Preferred substrates of root **elongases** were acyl-CoAs of the chain length C18 and C20, whereas monounsaturated acyl-CoAs (C16:1 and C18:1) and acyl-CoAs of lower (C12-C16) and higher chain lengths (C22-C24) were rarely elongated. **Elongase** activities significantly decreased over the length (40 cm) of 10-day-old corn roots going from the young tip to the older base of the root. Thus, results presented here show the presence and activity of **elongases** in roots of plants.

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ACCESSION NUMBER: 1998:42513 AGRICOLA
DOCUMENT NUMBER: IND21233827
TITLE: Fatty acid and wax biosynthesis in susceptible and triallate-resistant Avena fatua L.

AUTHOR(S): Kern, A.J.; Jackson, L.L.; Dyer, W.E.
AVAILABILITY: DNAL (SB951.P47)
SOURCE: Pesticide science, Sept 1997. Vol. 51, No. 1. p. 21-26
Publisher: Chichester, West Sussex : John Wiley and Sons Limited.
CODEN: PSSCBG; ISSN: 0031-613X
NOTE: Includes references
PUB. COUNTRY: England; United Kingdom
DOCUMENT TYPE: Article
FILE SEGMENT: Non-U.S. Imprint other than FAO
LANGUAGE: English

AB The recent characterization of triallate-resistant lines of wild oat (Avena fatua L.) deficient in triallate sulfoxidation provides an experimental system to investigate and differentiate the effects of triallate and triallate sulfoxide on wax and lipid biosynthesis. Greenhouse applications of triallate dramatically reduced epicuticular wax deposition in susceptible (S) but not resistant (R) wild oats. Triallate treatment had no effect on in-vivo concentrations of C12 to C26 fatty acids and fatty alcohols in R plants, while **elongated fatty acid** fractions (C > 18) were significantly reduced in S plants. In contrast, treatment with triallate sulfoxide reduced in-vivo concentrations of **elongated fatty acids** equally in R and S, supporting the hypothesis that triallate sulfoxide is more inhibitory than triallate towards fatty acid **elongases**. Although de-novo synthesis of short-chain fatty acids was not affected by triallate or triallate sulfoxide in R or S plants, synthesis of **elongated fatty acid** fractions was dramatically reduced in S plants by triallate. Fatty acid biosynthesis in R and S plants was equally sensitive to triallate sulfoxide. The results support the idea that in-vivo triallate sulfoxidation is necessary for herbicidal activity, and confirm that reduced rates of triallate sulfoxidation confer resistance in R wild oats.

L5 ANSWER 7 OF 17 BIOSIS COPYRIGHT (c) 2005 The Thomson Corporation on STN
ACCESSION NUMBER: 2005:176735 BIOSIS
DOCUMENT NUMBER: PREV200500174426
TITLE: Biochemical characterization of **elongase** activity in corn (Zea mays L.) roots.
AUTHOR(S): Schreiber, Lukas [Reprint Author]; Franke, Rochus; Lessire, Ren
CORPORATE SOURCE: Dept EcophysiolInst Mol and Cellular BiolIZMT, Univ Bonn, Kirschallee 1, D-53115, Bonn, Germany
lukas.schreiber@uni-bonn.de
SOURCE: Phytochemistry (Amsterdam), (January 2005) Vol. 66, No. 2, pp. 131-138. print.
ISSN: 0031-9422 (ISSN print).
DOCUMENT TYPE: Article
LANGUAGE: English
ENTRY DATE: Entered STN: 4 May 2005
Last Updated on STN: 4 May 2005

AB Chemical analysis of 4-day-old corn (Zea mays L.) root cell walls revealed that the lipophilic biopolymer suberin forms an important constituent of rhizodermal and hypodermal cell walls. Identified aliphatic monomers had chain lengths ranging from C16 to C26 and they belonged to 5 substance classes (omega-hydroxycarboxylic acids, 1,omega-dicarboxylic acids, 2-hydroxycarboxylic acids, carboxylic acids and alcohols) by which suberin is characterized. Biochemical experiments proved the occurrence of **elongase** activities in corn roots. Highest enzymatic activities were found in corn root microsomes, and major products synthesized by root **elongases** were **elongated fatty acids** with chain lengths ranging from C20 to C24. Preferred substrates of root **elongases** were acyl-CoAs of the chain length C18 and C20, whereas monounsaturated acyl-CoAs (C16:1 and C18:1) and acyl-CoAs of lower (C12-C16) and higher chain lengths (C22-C24) were rarely elongated.

Elongase activities significantly decreased over the length (40 cm) of 10-day-old corn roots going from the young tip to the older base of the root. Thus, results presented here show the presence and activity of **elongases** in roots of plants. Copyright 2004 Elsevier Ltd. All rights reserved.

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ACCESSION NUMBER: 2005:42417 BIOSIS
DOCUMENT NUMBER: PREV200500041515
TITLE: Biosynthesis of very-long-chain polyunsaturated fatty acids in transgenic oilseeds: Constraints on their accumulation.
AUTHOR(S): Abbadi, Amine [Reprint Author]; Domergue, Frederic; Bauer, Joerg; Napier, Johnathan A.; Welti, Ruth; Zaehringer, Ulrich; Cirpus, Petra; Heinz, Ernst
CORPORATE SOURCE: Inst Allgemeine Bot, Univ Hamburg, H-22609, Hamburg, Germany
abbadi@botanik.uni-hamburg.de; eheinz@botanik.uni-hamburg.de
SOURCE: Plant Cell, (October 2004) Vol. 16, No. 10, pp. 2734-2748. print.
CODEN: PLCEEW. ISSN: 1040-4651.
DOCUMENT TYPE: Article
LANGUAGE: English
ENTRY DATE: Entered STN: 26 Jan 2005
Last Updated on STN: 26 Jan 2005

AB omega6- and omega3-polyunsaturated C20 fatty acids represent important components of the human diet. A more regular consumption and an accordingly sustainable source of these compounds are highly desirable. In contrast with the very high levels to which industrial fatty acids have to be enriched in plant oils for competitive use as chemical feedstocks, much lower percentages of very-long-chain polyunsaturated fatty acids (VLCPUFA) in edible plant oils would satisfy nutritional requirements. Seed-specific expression in transgenic tobacco (Nicotiana tabacum) and linseed (Linum usitatissimum) of cDNAs encoding fatty acyl-desaturases and **elongases**, absent from all agronomically important plants, resulted in the very high accumulation of DELTA6-desaturated C18 fatty acids and up to 5% of C20 polyunsaturated fatty acids, including arachidonic and eicosapentaenoic acid. Detailed lipid analyses of developing seeds from transgenic plants were interpretated as indicating that, after desaturation on phosphatidylcholine, DELTA6-desaturated products are immediately channeled to the triacylglycerols and effectively bypass the acyl-CoA pool. Thus, the lack of available DELTA6-desaturated acyl-CoA substrates in the acyl-CoA pool limits the synthesis of **elongated** C20 **fatty acids** and disrupts the alternating sequence of lipid-linked desaturations and acyl-CoA dependent elongations. As well as the successful production of VLCPUFA in transgenic oilseeds and the identification of constraints on their accumulation, our results indicate alternative strategies to circumvent this bottleneck.

L5 ANSWER 9 OF 17 BIOSIS COPYRIGHT (c) 2005 The Thomson Corporation on STN
ACCESSION NUMBER: 2004:348186 BIOSIS
DOCUMENT NUMBER: PREV200400349937
TITLE: Zebrafish cDNA encoding multifunctional fatty acid **elongase** involved in production of eicosapentaenoic (20:5n-3) and docosahexaenoic (22:6n-3) acids.
AUTHOR(S): Agaba, Morris; Tocher, Douglas R. [Reprint Author]; Dickson, Cathryn A.; Dick, James R.; Teale, Alan J.
CORPORATE SOURCE: Inst Aquaculture, Univ Stirling, Stirling, FK9 4LA, Scotland
d.r.tocher@stir.ac.uk
SOURCE: Marine Biotechnology (New York), (May 2004) Vol. 6, No. 3, pp. 251-261. print.
ISSN: 1436-2228 (ISSN print).

DOCUMENT TYPE: Article
LANGUAGE: English
ENTRY DATE: Entered STN: 18 Aug 2004
Last Updated on STN: 18 Aug 2004

AB Enzymes that increase the chain length of fatty acids are essential for biosynthesis of highly unsaturated fatty acids. The gLELO gene encodes a protein involved in the elongation of polyunsaturated fatty acids in the fungus Mortierella alpina. A search of the GenBank database identified several expressed sequence tag sequences, including one obtained from zebrafish (Danio rerio), with high similarity to gLELO. The full-length transcript ZfELO, encoding a polypeptide of 291 amino acid residues, was isolated from zebrafish liver cDNA. The predicted amino acid sequence of the open reading frame shared high similarity with the **elongases** of Caenorhabditis elegans and human. When expressed in Saccharomyces cerevisiae, the zebrafish open reading frame conferred the ability to lengthen the chain of a range of C18, C20, and C22 polyunsaturated fatty acids, indicating not only that biosynthesis of 22:6n-3 from 18:3n-3 via a 24-carbon intermediate is feasible, but also that one **elongase** enzyme can perform all three elongation steps required. The zebrafish enzyme was also able to **elongate** monounsaturated and saturated **fatty acids**, and thus demonstrates a greater level of promiscuity in terms of substrate use than any **elongase** enzyme described previously.

L5 ANSWER 10 OF 17 BIOSIS COPYRIGHT (c) 2005 The Thomson Corporation on STN
ACCESSION NUMBER: 1997:459396 BIOSIS
DOCUMENT NUMBER: PREV199799758599
TITLE: Fatty acid and wax biosynthesis in susceptible and triallate-resistant Avena fatua L.
AUTHOR(S): Kern, Anthony J. [Reprint author]; Jackson, Larry L.; Dyer, William E. [Reprint author]
CORPORATE SOURCE: Dep. Plant Soil Environ. Sci., Montana State Univ., Bozeman, MT 59717-0312, USA
SOURCE: Pesticide Science, (1997) Vol. 51, No. 1, pp. 21-26. CODEN: PSSCBG. ISSN: 0031-613X.
DOCUMENT TYPE: Article
LANGUAGE: English
ENTRY DATE: Entered STN: 27 Oct 1997
Last Updated on STN: 10 Dec 1997

AB The recent characterization of triallate-resistant lines of wild oat (Avena fatua L.) deficient in triallate sulfoxidation provides an experimental system to investigate and differentiate the effects of triallate and triallate sulfoxide on wax and lipid biosynthesis. Greenhouse applications of triallate dramatically reduced epicuticular wax deposition in susceptible (S) but not resistant (R) wild oats. Triallate treatment had no effect on in-vivo concentrations of C-12 to C-26 fatty acids and fatty alcohols in R plants, while **elongated fatty acid** fractions (C gt 18) were significantly reduced in S plants. In contrast, treatment with triallate sulfoxide reduced in-vivo concentrations of **elongated fatty acids** equally in R and S, supporting the hypothesis that triallate sulfoxide is more inhibitory than triallate towards fatty acid **elongases**. Although de-novo synthesis of short-chain fatty acids was not affected by triallate or triallate sulfoxide in R or S plants, synthesis of **elongated fatty acid** fractions was dramatically reduced in S plants by triallate. Fatty acid biosynthesis in R and S plants was equally sensitive to triallate sulfoxide. The results support the idea that in-vivo triallate sulfoxidation is necessary for herbicidal activity, and confirm that reduced rates of triallate sulfoxidation confer resistance in R wild oats.

L5 ANSWER 11 OF 17 CAPLUS COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 2005:44368 CAPLUS

DOCUMENT NUMBER: 142:311853
TITLE: Biochemical characterization of **elongase** activity in corn (Zea mays L.) roots
AUTHOR(S): Schreiber, Lukas; Franke, Rochus; Lessire, Rene
CORPORATE SOURCE: Department of Ecophysiology, Institute of Cellular and Molecular Botany (IZMB), University of Bonn, Bonn, D-53115, Germany
SOURCE: Phytochemistry (Elsevier) (2005), 66(2), 131-138
CODEN: PYTCAS; ISSN: 0031-9422
PUBLISHER: Elsevier B.V.
DOCUMENT TYPE: Journal
LANGUAGE: English

AB Chemical anal. of 4-day-old corn (Zea mays L.) root cell walls revealed that the lipophilic biopolymer suberin forms an important constituent of rhizodermal and hypodermal cell walls. Identified aliphatic monomers had chain lengths ranging from C16 to C26 and they belonged to 5 substance classes (ω-hydroxycarboxylic acids, 1,ω-dicarboxylic acids, 2-hydroxycarboxylic acids, carboxylic acids and alcs.) by which suberin is characterized. Biochem. expts. proved the occurrence of **elongase** activities in corn roots. Highest enzymic activities were found in corn root microsomes, and major products synthesized by root **elongases** were **elongated fatty acids** with chain lengths ranging from C20 to C24. Preferred substrates of root **elongases** were acyl-CoAs of the chain length C18 and C20, whereas monounsatd. acyl-CoAs (C16:1 and C18:1) and acyl-CoAs of lower (C12-C16) and higher chain lengths (C22-C24) were rarely elongated. **Elongase** activities significantly decreased over the length (40 cm) of 10-day-old corn roots going from the young tip to the older base of the root. Thus, results presented here show the presence and activity of **elongases** in roots of plants.

REFERENCE COUNT: 48 THERE ARE 48 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 12 OF 17 CAPLUS COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 2004:900207 CAPLUS
DOCUMENT NUMBER: 142:89851
TITLE: Biosynthesis of very-long-chain polyunsaturated fatty acids in transgenic oilseeds: Constraints on their accumulation
AUTHOR(S): Abbadi, Amine; Domergue, Frederic; Bauer, Joerg; Napier, Johnathan A.; Welti, Ruth; Zaehringer, Ulrich; Cirpus, Petra; Heinz, Ernst
CORPORATE SOURCE: Institut fuer Allgemeine Botanik, Universitaet Hamburg, Hamburg, 22609, Germany
SOURCE: Plant Cell (2004), 16(10), 2734-2748
CODEN: PLCEEW; ISSN: 1040-4651
PUBLISHER: American Society of Plant Biologists
DOCUMENT TYPE: Journal
LANGUAGE: English

AB The ω6- and ω3-polyunsatd. C20 fatty acids represent important components of the human diet. A more regular consumption and an accordingly sustainable source of these compds. are highly desirable. In contrast with the very high levels to which industrial fatty acids have to be enriched in plant oils for competitive use as chemical feedstocks, much lower percentages of very-long-chain polyunsatd. fatty acids (VLCPUFA) in edible plant oils would satisfy nutritional requirements. Seed-specific expression in transgenic tobacco (Nicotiana tabacum) and linseed (Linum usitatissimum) of cDNAs encoding fatty acyl-desaturases and **elongases**, absent from all agronomically important plants, resulted in the very high accumulation of Δ6-desatd. C18 fatty acids and up to 5% of C20 polyunsatd. fatty acids, including arachidonic and eicosapentaenoic acid. Detailed lipid analyses of developing seeds from transgenic plants were interpreted as indicating that, after desatn. on phosphatidylcholine, Δ6-desatd. products are immediately channeled

to the triacylglycerols and effectively bypass the acyl-CoA pool. Thus, the lack of available Δ6-desatd. acyl-CoA substrates in the acyl-CoA pool limits the synthesis of **elongated** C20 **fatty acids** and disrupts the alternating sequence of lipid-linked desaturations and acyl-CoA dependent elongations. As well as the successful production of VLCPUFA in transgenic oilseeds and the identification of constraints on their accumulation, our results indicate alternative strategies to circumvent this bottleneck.

REFERENCE COUNT: 56 THERE ARE 56 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 13 OF 17 CAPLUS COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 2004:557613 CAPLUS
DOCUMENT NUMBER: 141:346651
TITLE: Zebrafish cDNA Encoding Multifunctional Fatty Acid **Elongase** Involved in Production of Eicosapentaenoic (20:5n-3) and Docosahexaenoic (22:6n-3) Acids
AUTHOR(S): Agaba, Morris; Tocher, Douglas R.; Dickson, Cathryn A.; Dick, James R.; Teale, Alan J.
CORPORATE SOURCE: Institute of Aquaculture, University of Stirling, Stirling, FK9 4LA, UK
SOURCE: Marine Biotechnology (2004), 6(3), 251-261
CODEN: MABIFW; ISSN: 1436-2228
PUBLISHER: Springer-Verlag New York Inc.
DOCUMENT TYPE: Journal
LANGUAGE: English
AB Enzymes that increase the chain length of fatty acids are essential for biosynthesis of highly unsatd. fatty acids. The gLELO gene encodes a protein involved in the elongation of polyunsatd. fatty acids in the fungus Mortierella alpina. A search of the GenBank database identified several expressed sequence tag sequences, including 1 obtained from zebrafish (Danio rerio), with high similarity to gLELO. The full-length transcript ZfELO, encoding a polypeptide of 291 amino acid residues, was isolated from zebrafish liver cDNA. The predicted amino acid sequence of the open reading frame shared high similarity with the **elongases** of Caenorhabditis elegans and human. When expressed in Saccharomyces cerevisiae, the zebrafish open reading frame conferred the ability to lengthen the chain of a range of C18, C20, and C22 polyunsatd. fatty acids, indicating not only that biosynthesis of 22:6n-3 from 18:3n-3 via a 24-carbon intermediate is feasible, but also that 1 **elongase** enzyme can perform all 3 elongation steps required. The zebrafish enzyme was also able to **elongate** monounsatd. and saturated **fatty acids**, and thus demonstrates a greater level of promiscuity in terms of substrate use than any **elongase** enzyme described previously.

REFERENCE COUNT: 40 THERE ARE 40 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 14 OF 17 CAPLUS COPYRIGHT 2005 ACS on STN
ACCESSION NUMBER: 1997:600786 CAPLUS
DOCUMENT NUMBER: 127:216314
TITLE: Fatty acid and wax biosynthesis in susceptible and triallate-resistant Avena fatua L
AUTHOR(S): Kern, Anthony J.; Jackson, Larry L.; Dyer, William E.
CORPORATE SOURCE: Dep. of Plant, Soil and Environ. Sci., Montana State Univ., Bozeman, MT, 59717-0312, USA
SOURCE: Pesticide Science (1997), 51(1), 21-26
CODEN: PSSCBG; ISSN: 0031-613X
PUBLISHER: Wiley
DOCUMENT TYPE: Journal
LANGUAGE: English
AB The recent characterization of triallate-resistant lines of wild oat (Avena fatua L.) deficient in triallate sulfoxidn. provides an exptl.

system to investigate and differentiate the effects of triallate and triallate sulfoxide on wax and lipid biosynthesis. Greenhouse applications of triallate dramatically reduced epicuticular wax deposition in susceptible (S) but not resistant (R) wild oats. Triallate treatment had no effect on in-vivo concns. of C12 to C26 fatty acids and fatty alcs. in R plants, while **elongated fatty acid** fractions (C > 18) were significantly reduced in S plants. In contrast, treatment with triallate sulfoxide reduced in-vivo concns. of **elongated fatty acids** equally in R and S, supporting the hypothesis that triallate sulfoxide is more inhibitory than triallate towards fatty acid **elongases**. Although de-novo synthesis of short-chain fatty acids was not affected by triallate or triallate sulfoxide in R or S plants, synthesis of **elongated fatty acid** fractions was dramatically reduced in S plants by triallate. Fatty acid biosynthesis in R and S plants was equally sensitive to triallate sulfoxide. Thus, in-vivo triallate sulfoxidn. is necessary for herbicidal activity, and confirm that reduced rates of triallate sulfoxidn. confer resistance in R wild oats.

REFERENCE COUNT: 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD. ALL CITATIONS AVAILABLE IN THE RE FORMAT

L5 ANSWER 15 OF 17 LIFESCI COPYRIGHT 2005 CSA on STN

ACCESSION NUMBER: 2005:77355 LIFESCI

TITLE: Zebrafish cDNA Encoding Multifunctional Fatty Acid **Elongase** Involved in Production of Eicosapentaenoic (20:5n-3) and Docosahexaenoic (22:6n-3) Acids

AUTHOR: Agaba, M.; Tocher, D.R.; Dickson, C.A.; Dick, J.R.; Teale, A.J.

CORPORATE SOURCE: Institute of Aquaculture, University of Stirling, Stirling FK9 4LA, Scotland, UK; E-mail: d.r.tocher@stir.ac.uk

SOURCE: Marine Biotechnology [Mar. Biotechnol.], (20040600) vol. 6, no. 3, pp. 251-261.
ISSN: 1436-2228.

DOCUMENT TYPE: Journal

FILE SEGMENT: Q4

LANGUAGE: English

SUMMARY LANGUAGE: English

AB Enzymes that increase the chain length of fatty acids are essential for biosynthesis of highly unsaturated fatty acids. The gLELO gene encodes a protein involved in the elongation of polyunsaturated fatty acids in the fungus Mortierella alpina. A search of the GenBank database identified several expressed sequence tag sequences, including one obtained from zebrafish (Danio rerio), with high similarity to gLELO. The full-length transcript ZfELO, encoding a polypeptide of 291 amino acid residues, was isolated from zebrafish liver cDNA. The predicted amino acid sequence of the open reading frame shared high similarity with the **elongases** of Caenorhabditis elegans and human. When expressed in Saccharomyces cerevisiae, the zebrafish open reading frame conferred the ability to lengthen the chain of a range of C sub(18), C sub(20), and C sub(22) polyunsaturated fatty acids, indicating not only that biosynthesis of 22:6n-3 from 18:3n-3 via a 24-carbon intermediate is feasible, but also that one **elongase** enzyme can perform all three elongation steps required. The zebrafish enzyme was also able to **elongate** monounsaturated and saturated **fatty acids**, and thus demonstrates a greater level of promiscuity in terms of substrate use than any **elongase** enzyme described previously.

L5 ANSWER 16 OF 17 LIFESCI COPYRIGHT 2005 CSA on STN

ACCESSION NUMBER: 2005:42543 LIFESCI

TITLE: Biosynthesis of Very-Long-Chain Polyunsaturated Fatty Acids in Transgenic Oilseeds: Constraints on Their Accumulation

AUTHOR: Abbadi, Amine; Domergue, Frederic; Bauer, Joerg; Napier, Johnathan A.; Welti, Ruth; Zaehringer, Ulrich; Cirpus, Petra; Heinz, Ernst

CORPORATE SOURCE: Institut fuer Allgemeine Botanik, Universitaet Hamburg, 22609 Hamburg, Germany
SOURCE: Plant Cell, (20041000) vol. 16, no. 10, pp. 2734-2748. ISSN: 1040-4651.
DOCUMENT TYPE: Journal
FILE SEGMENT: W2
LANGUAGE: English
SUMMARY LANGUAGE: English

AB omega 6- and omega 3-polyunsaturated C20 fatty acids represent important components of the human diet. A more regular consumption and an accordingly sustainable source of these compounds are highly desirable. In contrast with the very high levels to which industrial fatty acids have to be enriched in plant oils for competitive use as chemical feedstocks, much lower percentages of very- long-chain polyunsaturated fatty acids (VLCPUFA) in edible plant oils would satisfy nutritional requirements. Seed-specific expression in transgenic tobacco (Nicotiana tabacum) and linseed (Linum usitatissimum) of cDNAs encoding fatty acyl-desaturases and **elongases**, absent from all agronomically important plants, resulted in the very high accumulation of delta6-desaturated C18 fatty acids and up to 5% of C20 polyunsaturated fatty acids, including arachidonic and eicosapentaenoic acid. Detailed lipid analyses of developing seeds from transgenic plants were interpretated as indicating that, after desaturation on phosphatidylcholine, delta6-desaturated products are immediately channeled to the triacylglycerols and effectively bypass the acyl-CoA pool. Thus, the lack of available delta6-desaturated acyl-CoA substrates in the acyl-CoA pool limits the synthesis of **elongated** C20 **fatty acids** and disrupts the alternating sequence of lipid-linked desaturations and acyl-CoA dependent elongations. As well as the successful production of VLCPUFA in transgenic oilseeds and the identification of constraints on their accumulation, our results indicate alternative strategies to circumvent this bottleneck.

L5 ANSWER 17 OF 17 BIOTECHNO
ACCESSION NUMBER: 1997:27389654 BIOTECHNO
TITLE: Fatty acid and wax biosynthesis in susceptible and triallate-resistant Avena fatua L.
AUTHOR: Kern A.J.; Jackson L.L.; Dyer W.E.
CORPORATE SOURCE: A.J. Kern, Dept. of Plant Soil/Envtl. Sciences, Montana State University, Bozeman, MT 59717-0312, United States.
SOURCE: Pesticide Science, (1997), 51/1 (21-26), 19 reference(s)
CODEN: PSSCBG ISSN: 0031-613X
DOCUMENT TYPE: Journal; Article
COUNTRY: United Kingdom
LANGUAGE: English
SUMMARY LANGUAGE: English
AN 1997:27389654 BIOTECHNO

AB The recent characterization of triallate-resistant lines of wild oat (Arena fatua L.) deficient in triallate sulfoxidation provides an experimental system to investigate and differentiate the effects of triallate and triallate sulfoxide on wax and lipid biosynthesis. Greenhouse applications of triallate dramatically reduced epicuticular wax deposition in susceptible (s) but not resistant (R) wild oats. Triallate treatment had no effect on in-vivo concentrations of C.sub.1.sub.2 to C.sub.2.sub.6 fatty acids and fatty alcohols in R plants, while **elongated fatty acid** fractions (C > 18) were significantly reduced in S plants. In contrast, treatment with triallate sulfoxide reduced in-vivo concentrations of **elongated fatty acids** equally in R and S, supporting the hypothesis that triallate sulfoxide is more inhibitory than triallate towards fatty acid **elongases**. Although de-novo synthesis of short-chain fatty acids was not affected by triallate or triallate sulfoxide in R or S plants, synthesis of **elongated**

fatty acid fractions was dramatically reduced in S plants by triallate. Fatty acid biosynthesis in R and S plants was equally sensitive to triallate sulfoxide. The results support the idea that in-vivo triallate sulfoxidation is necessary for herbicidal activity, and confirm that reduced rates of triallate sulfoxidation confer resistance in R wild oats.